

- 1 1. A hydrogen gas generation and collection system comprising:
  - 2 a holding tank providing a reservoir of hydroxide solution;
  - 3 a gas generating tank in fluid flow communication with said reservoir, said generating
  - 4 tank comprising a plurality of metallic fuel rods;
  - 5 means for pressurizing the holding tank;
  - 6 means for transferring hydroxide solution into the gas generating tank from said
  - 7 holding tank in response to pressure to start a gas generating reaction in said generating tank;
  - 8 means for selectively pressurizing said generating tank to return hydroxide solution
  - 9 within the gas generating tank back into said holding tank to stop said reaction;
  - 10 a humidifier tank in fluid flow communication with said generating tank for receiving
  - 11 hydrogen gas from said generating tank and for humidifying it; and,
  - 12 means for delivering humidified hydrogen from said humidifier tank to an application.
  - 13
- 14 2. The gas generation and collection system of claim 1 wherein said fuel rods are tubular.
- 15
- 16 3. The gas generation and collection system of claim 2 wherein said fuel rods are
- 17 aluminum.
- 18
- 19 4. The gas generation and collection system of claim 1 wherein the hydroxide solution
- 20 comprises potassium hydroxide.
- 21
- 22 5. The gas generation and collection system of claim 4 wherein the hydroxide solution
- 23 comprises approximately 25% potassium hydroxide by weight.
- 24
- 25 6. The gas generation and collection system of claim 1 wherein said holding tank comprises
- 26 means for heating the hydroxide solution.
- 27
- 28 7. The gas generation and collection system of claim 6 wherein the temperature of the
- 29 holding tank hydroxide solution is approximately 180 degrees Fahrenheit.
- 30
- 31 8. The gas generation and collection system of claim 7 wherein said fuel rods are tubular.

1 9. The gas generation and collection system of claim 8 wherein the hydroxide solution  
2 comprises approximately 25% potassium hydroxide by weight.

4 10. A hydrogen gas generation and collection system comprising:

5 a holding tank providing a reservoir of hydroxide solution, said holding tank  
6 comprising means for heating the hydroxide solution;

7 a gas generating tank in fluid flow communication with said reservoir, said generating  
8 tank comprising a plurality of internal metallic fuel rods;

9 means for pressurizing the holding tank to transfer hydroxide solution into the gas  
10 generating tank from said holding tank thereby generating gas in said generating tank;

11 means for selectively pressurizing said generating tank to return hydroxide solution  
12 within the gas generating tank back into said holding tank to stop gas generation;

13 a humidifier tank in fluid flow communication with said generating tank for receiving  
14 hydrogen gas from said generating tank and for humidifying it;

15 means for delivering humidified hydrogen gas from said humidifier tank to an  
16 application for powering the application, the application producing exhaust;

17 a condenser for receiving said exhaust and producing condensate; and,

18 means for delivering said condensate into said holding tank.

20 11. The gas generation and collection system of claim 10 wherein the application  
21 comprises an engine or fuel cell.

23 12. The gas generation and collection system of claim 11 wherein said metallic fuel rods are

25 13. The gas generation and collection system of claim 10 wherein the hydroxide solution  
26 comprises approximately 25% potassium hydroxide by weight.

28 14. The gas generation and collection system of claim 13 wherein the temperature of the  
29 holding tank hydroxide solution is approximately 180 degrees Fahrenheit.

- 1 15. A method for generating hydrogen gas, the method comprising the steps of:  
2 providing a reservoir of hydroxide solution;  
3 providing a gas generating tank in fluid flow communication with said reservoir;  
4 equipping said generating tank with a plurality of tubular, metallic fuel rods;  
5 pressurizing the reservoir;  
6 transferring hydroxide solution into the gas generating tank from said holding tank in  
7 response to pressure to start a gas generating reaction in said generating tank;  
8 selectively pressurizing said generating tank to return hydroxide solution within the  
9 gas generating tank back into said reservoir to stop said reaction;  
10 humidifying hydrogen gas from said generating tank; and,  
11 delivering humidified hydrogen gas to an application.  
12
- 13 16. The method of claim 15 wherein the hydroxide solution providing step uses potassium  
14 hydroxide.  
15
- 16 17. The method of claim 16 wherein the hydroxide solution comprises 25% potassium  
17 hydroxide by weight.  
18
- 19 18. The method of claim 15 including the further step of heating the hydroxide solution  
20 within said reservoir.  
21
- 22 19. The method of claim 18 wherein the heating step raises the temperature of the reservoir  
23 hydroxide solution to approximately 180 degrees Fahrenheit.  
24
- 25 20. The method of claim 19 wherein said fuel rods are aluminum.  
26